**Amblyopia “*Lazy Eye”***

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**Definition:** A decrease in the best corrected acuity from one eye compared to the other

* 1 or more of the following need to occur before the age of 6y.
  + **Amblyogenic Anisometropia**- a large enough difference in prescription between the eyes where one eye doesn’t fully develop fine acuity.
  + **Constant unilateral strabismus at all distances**- one eye is turned 100% of the time.
  + **Amblyogenic bilateral isoametropia**- the prescription is large enough in both eyes where uncorrected, the eyes haven’t been able to develop fine acuity.
  + **Amblyogenic astigmatism**-the distortion or blur in 1 meridian is great enough that fine acuity is not developed.
  + **If 1 of these conditions are not met, a neurologic cause for the decreased vision *must* be ruled out!**
* **Depth of Acuity Loss:**
  + **Shallow-** 20/50-20/60
  + **Moderate-** 20/70-20/100
  + **Deep-** >20/200
* **Types of Amblyopia-** Refractive, Strabismic, Deprivation
  + **Refractive-** the most common type
* **Amblyogenic Anisometropia Criteria:**
  + Hyperopia >1D (50% >2.50D, 100% >3.50D)
  + Myopia >3D (50% >4.50D, 100% >6.50D)
  + Astigmatism >1.50D
* **Amblyogenic Isoametropia Criteria:**
  + Hyperopia >4D (50% >4D, 100% > 6D)
  + Myopia >6D (50% >6D, 100% > 8D)
  + Astigmatism >2.50
* **Strabismic-** Constant unilateral strabismus in all fields of gaze
  + Generally early onset before age 6y
  + There is no correlation between the amount that the eye is turned to the decrease in acuity.
* **Deprivation-** Secondary to physical obstruction of the visual pathway
  + cataract, corneal opacity, ptosis
  + Most difficult to treat.
* **Assessment:**
  + **Acuity**- patient will do best with single letter acuity vs line or chart.
    - *“Crowding Phenomenon”-* letters on the ends of the row are more easily read because the letters in the middle get jumbled up.
  + **Fusional Ability**
    - Stereo book, Worth 4 Dot
  + **Alignment**
    - Cover Test
  + **Anomalous Correspondence-** Binocular condition seen with strabismus- brain creates a “faux fovea” to eliminate diplopia.
    - Cover Test, Worth 4 Dot
  + **Eccentric fixation-** Monocular condition- brain perceives fovea to be off-centered.
    - Direct Ophthalmoscopy
* **Treatment:**
  + Refractive Correction- Glasses
    - Correct refractive error.
    - Shaw Lenses
  + Physical Occlusion- Patching
    - Not as effective since kids peek around patch.
    - Total occlusion of “good eye”
    - Not training the brain to be binocular and use the eyes together.
    - *If a patch is used-* Cling patch is best
      * Plastic cling that is cut to the shape of the lens and put over better eye. There are different amounts of blur depending on the depth of the amblyopia.
      * Acuity is checked monthly, and blur is reduced as the acuity improves.
      * The patched is not noticed by looking at glasses and is tolerated better.
  + Pharmacological Occlusion- Atropine drops
    - Only used if can’t afford or not candidate for Shaw lens, won’t cling patch, won’t do VT
    - Drops are put in the better eye 2 consecutive days a week which knocks out the near focusing so distance is seen in both eyes but only the weaker eye is used at near and for fine detail.
  + Vision Therapy
    - Weekly, in-office sessions, with activities that work on binocular skills, focusing on fine detail distance and near, and tracking.

***SHAW Lens***

* Iseikonic lenses that make the image magnification equal between the two eyes to improve binocularity.
* **Static aniseikonia** commonly occurs as a result of eyeglasses being made to correct anisometropia (eyes have different prescriptions). Basically, what happens with traditional eyeglasses design is that the approach is monocular in nature. The assumption is that if one lens makes the left eye’s vision crystal clear and another lens makes the right eye’s vision crystal clear, then the patient will be able to sort it out. The problem is that when you solve for anisometropia (different prescription for each eye), a monocular approach induces aniseikonia and makes the image sizes different in each eye. This creates a whole different set of problems for the wearer.
* Now the brain has to work to fuse these different-size images together. In dealing with the images that the glasses make, the brain may try to adapt by fighting to focus all the time or by suppressing the image from one eye, or it may not adapt and instead react with headaches, vision distortion or other problems, and the patient just stops wearing the glasses for any length of time. Through the patented binocular optimization program, every SHAW lens is designed to effectively eliminate the difference in the size of images in each eye. This provides much better vision, depth perception and comfort in wearing glasses.
* Shaw lenses also correct Dynamic aniseikonia which causes vertical distortion and interferes with reading.
* Shaw lenses work best to correct refractive amblyopia.
* Refractive or straight lazy eye has been traditionally treated by suppressing the vision in one eye (the “good” eye) using either a patch or drops.
* Amblyopia is caused by an image in one eye that is not synching with the image in the other eye. With a typical case of anisometropia, the image is focused in one eye and the other eye is defocused, and the brain will tend to ignore the defocused eye.
* If the defocused eye requires a prescription different from the other eye’s – which it frequently does – then the image in the “lazy” eye might be larger than the image in the “non-lazy” eye. Now the brain can’t fuse the two images because they are different sizes.
* So even though you give the child eyeglasses, the treatment is not sufficient because the larger image from the treated eye no longer fuses with the image in the good eye, so suppression starts to occur. This inhibits the improvement we look for in the treatment of amblyopia.
* By giving the child SHAW™ lenses, the images are equalized at the retinal level. Sensory fusion can now occur. The patient can integrate the two images more easily. We’ve found through clinical research that the time taken to correct the amblyopia is significantly reduced and, best of all, vision suppression using a patch or drops may not be necessary.